CLAIMS:

1. A current measuring device, which is capable of measuring a current flowing via an artificial lipid bilayer membrane, comprising: an upper solution chamber which is capable of containing aqueous solution; and a lower solution chamber disposed below the upper solution chamber, a bottom of the upper solution chamber having a membrane formation opening, a bottom of the lower solution chamber having a support layer for supporting the artificial lipid bilayer membrane, the artificial lipid bilayer membrane formed on the membrane formation opening of the upper solution chamber being brought into contact with the support layer so as to be supported,

said current measuring device further comprising: a bottom plate on which the support layer is placed; and an interval keeping member for keeping a predetermined interval between the upper solution chamber and the bottom plate, wherein

the lower solution chamber is provided below the upper solution chamber provided by being surrounded with the bottom plate and the interval keeping member, and

the artificial lipid bilayer membrane formed on the membrane formation opening is swollen to a side of the lower solution chamber so as to be made thinner and come into contact with the support layer so that the artificial lipid bilayer membrane is supported on the support layer.

2. The current measuring device as set forth in claim 1 comprising negative pressure generation means for dropping an internal pressure of the lower solution chamber provided by being surrounded with the bottom plate and the interval keeping member, wherein

the negative pressure generation means causes the artificial lipid bilayer membrane formed on the membrane formation opening of the upper solution chamber to swell to the side of the lower solution chamber.

3. The current measuring device as set forth in claim 2, wherein the negative pressure generation means is formed in the interval keeping member and includes (i) a suction port which allows connection between the lower solution chamber and an outside and (ii) sucking means which is connected to the suction port so as to suck the aqueous solution in the lower solution chamber.

4. The current measuring device as set forth in claim 1, wherein the interval keeping member is capable of changing an interval between the upper solution chamber and the bottom plate, and the change of the interval causes the artificial lipid bilayer membrane formed on the membrane formation opening of the upper solution chamber to swell to the side of the lower solution chamber.

5. The current measuring device as set forth in claim 4, wherein the interval keeping member is made of an elastic material so as to be capable of expanding and contracting.

6. The current measuring device as set forth in any one of claims 1 to 5, wherein the support layer is made of polymer gel.

7. The current measuring device as set forth in claim 6, wherein agarose or polyacrylamide is used as the polymer gel.

8. The current measuring device as set forth in claim 6 or

7, wherein a thickness of the support layer made of the polymer gel is 50 nm or more and 2 mm or less.

9. The current measuring device as set forth in any one of claims 1 to 8, wherein a diameter of the membrane formation opening is 10 μm or more and 500 μm or less.

10. The current measuring device as set forth in any one of claims 1 to 9, wherein the bottom plate is made of a translucent material, and optical observation means which allows observation of the artificial lipid bilayer membrane on the support layer is provided below the bottom plate.

11. The current measuring device as set forth in any one of claims 1 to 10 comprising: current measuring means electrically connected to the upper solution chamber; and earthing means electrically connected to the lower solution chamber.

12. The current measuring device as set forth in any one of claims 1 to 11, wherein the artificial lipid bilayer membrane includes an ion channel.